UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,979	12/31/2001	Debargha Mukherjee	10006292-1	5324

7590 03/15/2004	EXAMINER
HEWLETT-PACKARD COMPANY	LAROSE, COLIN M
Intellectual Property Administration	

ART UNIT	PAPER NUMBER
2623	

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DATE MAILED: 03/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2004*.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *14-19* is/are allowed.

6)☒ Claim(s) *1-3,5,6,8-10 and 13* is/are rejected.

7)☒ Claim(s) *4,7,11 and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *8*.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

2.   The text of those sections of Title 35, U.S. Code not included in this action can be found

in a prior Office action.

3.   Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent

5,900,953 by Bottou et al. ("Bottou") in view of de Queiroz '981.

[de Queiroz '981 incorporates by reference U.S. Patent 6,334,001 by de Queiroz et al.

("de Queiroz '001"). See column 3, lines 45-50 and column 4, lines 7-8.]

Regarding claim 1, Bottou discloses a method of decomposing an image comprising the

steps of:

a) decomposing the image into a plurality of stripes (column 4, lines 3-6: image is

divided into rectangular stripes);

b) determining a layer base color, a layer size, and a layer offset of at least one stripe of

the plurality of stripes (figure 2 and column 3, lines 25-34: A pixel of interest is determined to

reside in either the foreground layer or the background layer based on the difference (offset)

between the current color of each of the layers and the color of the pixel of interest. This

difference corresponds to the "layer offset". The foreground and background layer base colors

are determined as an average of all the pixels in each layer. And after all pixels in all the stripes

are assigned to either the foreground layer of background layer, then the size of each layer is

known.); and

c) separating said at least one stripe into a foreground layer and a background layer based

on the layer base color and the layer offset (column 3, lines 25-34: as explained above, the pixels

of each stripe in the image are separated into the foreground and background layers based on

both the color of the layers ("layer base colors") and the offset between the pixel of interest and

the layer base colors ("layer offset")).

Bottou is silent to creating a mask layer and interpolating irrelevant values, as claimed.

de Queiroz '981 discloses a system for segmenting images into foreground and

background planes in the Mixed Raster Content environment, similar to that of Bottou. In

particular, de Quieroz discloses segmenting a document into 3 layers – background, foreground,

and selector (column 5, lines 32-49).

It would have been obvious to one of ordinary skill in the art at the time of the invention

to modify Bottou by de Queiroz '981 to further separate the image into a mask layer, as claimed,

since de Queiroz '981 discloses that, for the MRC format, images are conventionally segmented

into foreground and background layers, and a mask layer is also created in order to indicate to

which layer each pixel belongs (see column 1, lines 25-32).

de Queiroz '001 discloses that a way to enhance compression of MRC-decomposed

documents is to interpolate irrelevant pixels in the background and foreground layers (de

Queiroz '001, column 9, lines 41-55: irrelevant pixels (N's) are interpolated (i.e. replaced)).

It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Bottou by de Queiroz '981 to interpolate, as claimed, since de Queiroz '001 discloses that interpolating irrelevant pixel values in the foreground and background layers enhances compression (i.e. interpolating increases coder efficiency).

Regarding claim 2, Bottou discloses encoding each of the layers (column 1, lines 36-38).

Regarding claim 3, de Queiroz '981 discloses the foreground and background are JPEG encoded, wherein the mask is JBIG encoded (column 5, line 57 through column 6, line 3).

4.   Claims 5, 6, 8-10, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bottou in view of de Queiroz '981, and further in view of "On Data Filling algorithms for MRC Layers" by de Queiroz ("Data Filling").

Regarding claim 5, de Queiroz '001 discloses the interpolating step d) further comprises the steps:

i) classifying each pixel within a selected block of a selected layer as relevant or irrelevant (figure 4: Y = relevant pixels, N = irrelevant pixels);

ii) generating a coefficient block representing a forward transform of the selected block (804, figure 9);

iii) modifying coefficient values to generate a modified coefficient block (804: quantize coefficients and 806: remove some coefficients) subject to a set of predetermined constraints (812: the condition(s) to stop modifying the coefficients).

de Queiroz '001 discloses that the pre-determined constraints include comparing the relevant pixels in consecutive blocks and discontinuing the iterations if "a designated criteria is met" or "a designated amount of improvement or change has occurred" (column 10, lines 34-44).

Thus, de Queiroz '001 does not expressly disclose the constraint is that the "relevant pixels have a same value in an inverse transformation of the modified block as in the selected block.

"Data Filling" is a paper by de Queiroz that discloses the same iterative modification of DCT coefficients for each block. In particular, "Data Filling" discloses that the constraint for modifying the DCT coefficients is "convergence", wherein convergence is achieved when successive relevant pixels are identical (see Section 4.2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify de Queiroz '001 so that the constraint for modifying the coefficients is that the relevant pixel have a same value as claimed, since "Data Filling" teaches that using the claimed stopping criteria achieves superior results.

Regarding claim 6, de Queiroz '001 discloses step d) iii) includes:

a) selecting a coefficient from the coefficient block in a reverse zig-zag order wherein the selected coefficient has a non-zero value (806, figure 9: high frequency coefficients are selected (and removed), according to the zig-zag order shown in figure 10); and

b) finding a feasible solution resulting in a zero quantizable selected coefficient subject to the predetermined constraints (812, figure 9: a feasible solution is reached when the stopping criteria is met (i.e. convergence is achieved, per "Data Filling"); and the solution contains coefficients quantized to zero (i.e. removed)).

Regarding claim 8, de Queiroz '001 discloses values of individual elements of a mask classify pixels in corresponding positions within the selected block as relevant or irrelevant (figure 3: pixels values in mask (selector plane) determine the relevance of pixels in the upper and lower planes, as shown in figure 4).

Regarding claim 9, de Queiroz '001 discloses the step of :

e) providing the modified coefficient block to a block compression process (figure 9: modified coefficient block from 804 is sent to a block compression stage (806) to remove high frequency coefficients).

Regarding claim 10, de Queiroz '001 discloses step d) further comprises the step of applying a linear program to identify a feasible solution resulting in a zero-quantizable coefficient subject to the constraints (812, figure 9: a linear inequality function ("program") is applied to determine if the current pixels are sufficiently close to the original pixels).

Regarding claim 13, de Queiroz '001 discloses that the forward transform is discrete cosine (804, figure 9).

Allowable Subject Matter

5.   Claims 4, 7, 11, and 12, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 14-19 are allowed.

Conclusion

6.   Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489.

The examiner can normally be reached Monday through Thursday from 8:00 to 5:30. The

examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the

organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the TC 2600 Customer Service Office whose telephone number is (703)

306-0377.

CML

Group Art Unit 2623

6 March 2004

AMELIA M. AU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600